Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 17 (3): 873–876
https://doi.org/10.15560/17.3.873

PENSOFT

First report of the freshwater gastropod *Pettancylus tenuis* (Bourguignat, 1862) (Gastropoda, Planorbidae) from Pune region, India

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Abstract

We present the first record of the freshwater gastropod *Pettancylus tenuis* from the Pune region of India. This species, which resembles a limpet, was found in November and December 2020 in a wetland formed near the confluence of Mula and Ram rivers in Pune city. The shell characters of the specimens match the available description of the species. The other records of this species from Maharashtra are nearly 150 km from Pune.

Keywords

Ancylinae, freshwater limpet, rivers, range extension, snails, wetlands

Academic editor: Carl Christensen | Received 23 March 2021 | Accepted 25 May 2021 | Published 4 June 2021

Citation: Shinde YS, Deshpande S, Amritkar K, Padhye SM, Vanjare C (2021) First report of the freshwater gastropod *Pettancylus tenuis* (Bourguignat, 1862) (Gastropoda, Planorbidae) from Pune region, India. Check List 17 (3): 873–876. https://dor.org/10.15560/17.3.873

Introduction

Freshwater gastropods are a diverse group of invertebrates frequently seen in all types of freshwater habitats (Strong et al. 2008; Girones et al. 2020). There are over 100 species of freshwater gastropods documented in India to date, although a comprehensive and taxonomically updated review of the fauna is still lacking (Ramakrishna and Dey 2007; Aravind et al. 2011).

Pune, a city located in the state of Maharashtra on the slopes of the Western Ghats, is one of the rapidly growing urban centers in India (Krishnamurthy et al. 2016). The latest faunal checklist of the freshwater molluscs from this region, now over 40 years old, includes over 20 species of gastropods (plus varieties) and presents short diagnoses for each species (Subba Rao and Mitra 1979).

Six species of the freshwater limpet genus *Pettancylus* Iredale, 1943 (reported as *Ferrissia* Walker, 1903) are currently known from India (Ramakrishna and Dey 2007; Sankarappan et al. 2015). They superficially resemble limpets in morphology, but actually belong to the family Planorbidae (subfamily Ancylinae) (MolluscaBase 2021). Of the six species, two are known from Maharashtra: *Pettancylus verruca* (Benson, 1855) and

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Pettancylus tenuis (Bourguignat, 1862). *Pettancylus verruca* is distributed throughout India, while *P. tenuis* is restricted to Nilgiris (its type locality) and adjacent hills in southern India along with two reports from a few places in south-western Maharashtra (Subba Rao 1993; Devi and Jauhari 2008; Sankarappan et al. 2015).

To our knowledge, a reliable report of *P. tenuis* from the Pune region, which comprises the Pune Metropolitan Region *sensu* Krishnamurthy et al. (2016), does not exist until now. We present the first authentic report of *P.tenuis* from Pune with a brief taxonomic diagnosis of the shell and corresponding digital images.

Methods

A small wetland habitat is formed near the convergence zone of Mula and Ram rivers at Baner, Pune (Fig. 1B). At this confluence, a unique riparian ecosystem is formed, with ample diversity of flora and fauna along with natural wetlands (Fig. 1A). The wetland also has live springs and boasts a pristine forest in heart of Pune city (SD and KA pers. obs.). Limpet specimens were collected during November and December 2020. The samples were obtained from the littoral part of the wetland. A hand net having a mesh of 200 µm was used for collecting gastropods as a part of a larger survey by dragging it through the aquatic vegetation. Limpets were picked from the collected contents with forceps. The specimens were preserved in 4% formalin in the field and observed and photographed under a trinocular stereomicroscope (Micron Optik Zoom) in the lab. Photos were edited using Inkscape v. 1.0. Specimens were deposited at the Department of Zoology, Ahmednagar College, Ahmednagar, Maharashtra.

Specimens were identified following Subba Rao (1993), Ramakrishna and Dey (2007), and Sankarappan et al. (2015). The latest taxonomical nomenclature was confirmed using MolluscaBase (2021).

Results

Family Planorbidae
Genus *Pettancylus* Iredale, 1943

***Pettancylus tenuis* (Bourguignat, 1862)**
Figure 2A–C

New records. INDIA – **Maharashtra** • Pune, Ram-Mula confluence; 18°33′48″N, 073°47′37″E; 13-XI-2021; Yugandhar Shinde leg.; RM 001, 3 specimens.

Identification. Length 2.5 and 3.0 mm; width 1.3 and 2.0 mm; height 0.6 and 0.8 mm; shell very small, suboval, fragile, nearly opaque; outline of the shell roughly bilaterally symmetrical and sides almost parallel; greatest height at the posterior third; shell length almost 1.5× maximum width and ~3.5× maximum height, apex blunt, reflected to the right. Soft parts not studied.

This species can be separated from the other Indian species on account of its small size, the position of the highest part of the shell in the posterior third, and the broadly bilateral symmetry of the shell outline and parallel side margins (*sensu* Ramakrishna and Dey 2007).

This report extends the range of *P. tenuis* species further north by nearly 150 km (Fig. 1B).

Discussion

The distribution of *Pettancylus* species in India varies, with *Pettancylus verruca* occurring throughout India, while *Pettancylus baconi* (Bourguignat, 1854) and *Pettancylus viola* (Annandale & Prashad, 1921) are restricted to east-northeastern India. *Pettancylus ceylanica* (Benson, 1864), which has a disjunct distribution within the Indian subcontinent, is reported from Manipur in northeastern India and Sri Lanka (Ramakrishna and Dey 2007). The recently described *Pettancylus fivefallsiensis* Sankarappan, Chellapandian, Vimalanathan,

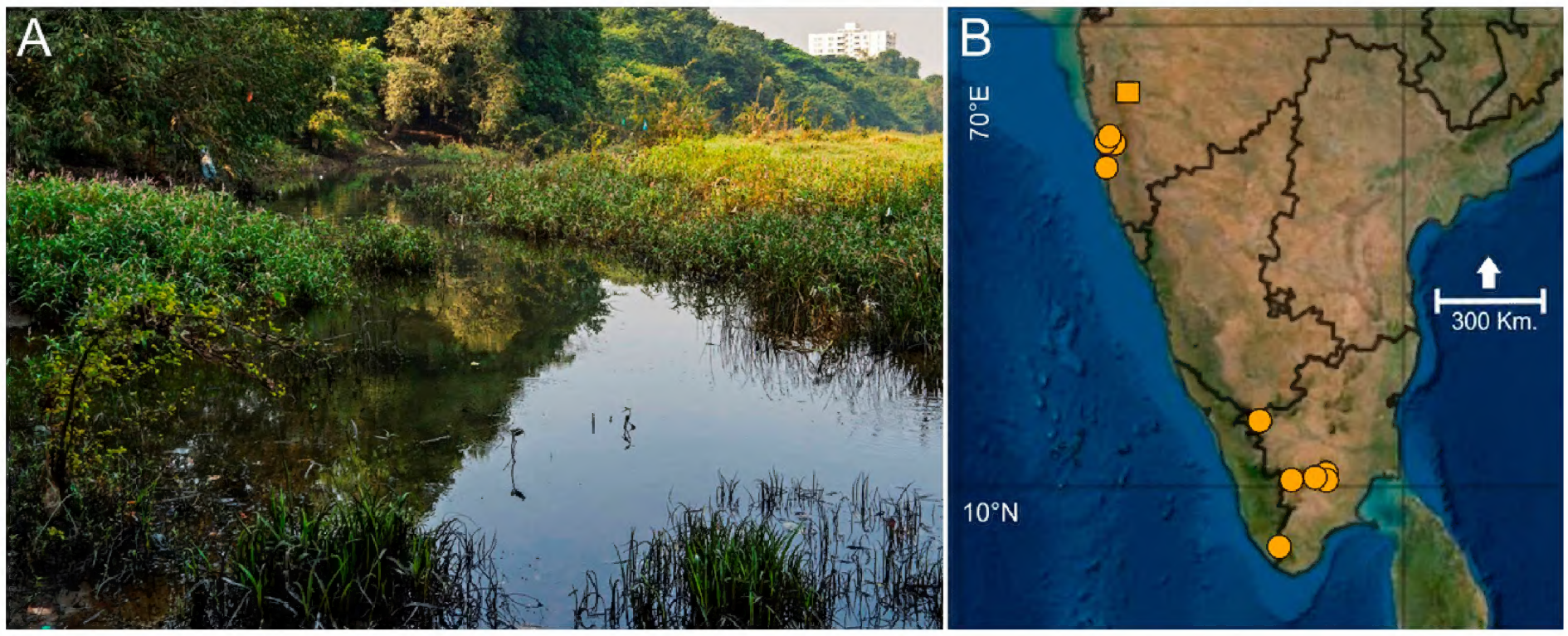

Figure 1. Habitat and distribution of *Pettancylus tenuis* **A.** Wetland locality where *P. tenuis* was found. **B.** Distribution of *P. tenuis* in India: circles = literature records; square = new record.

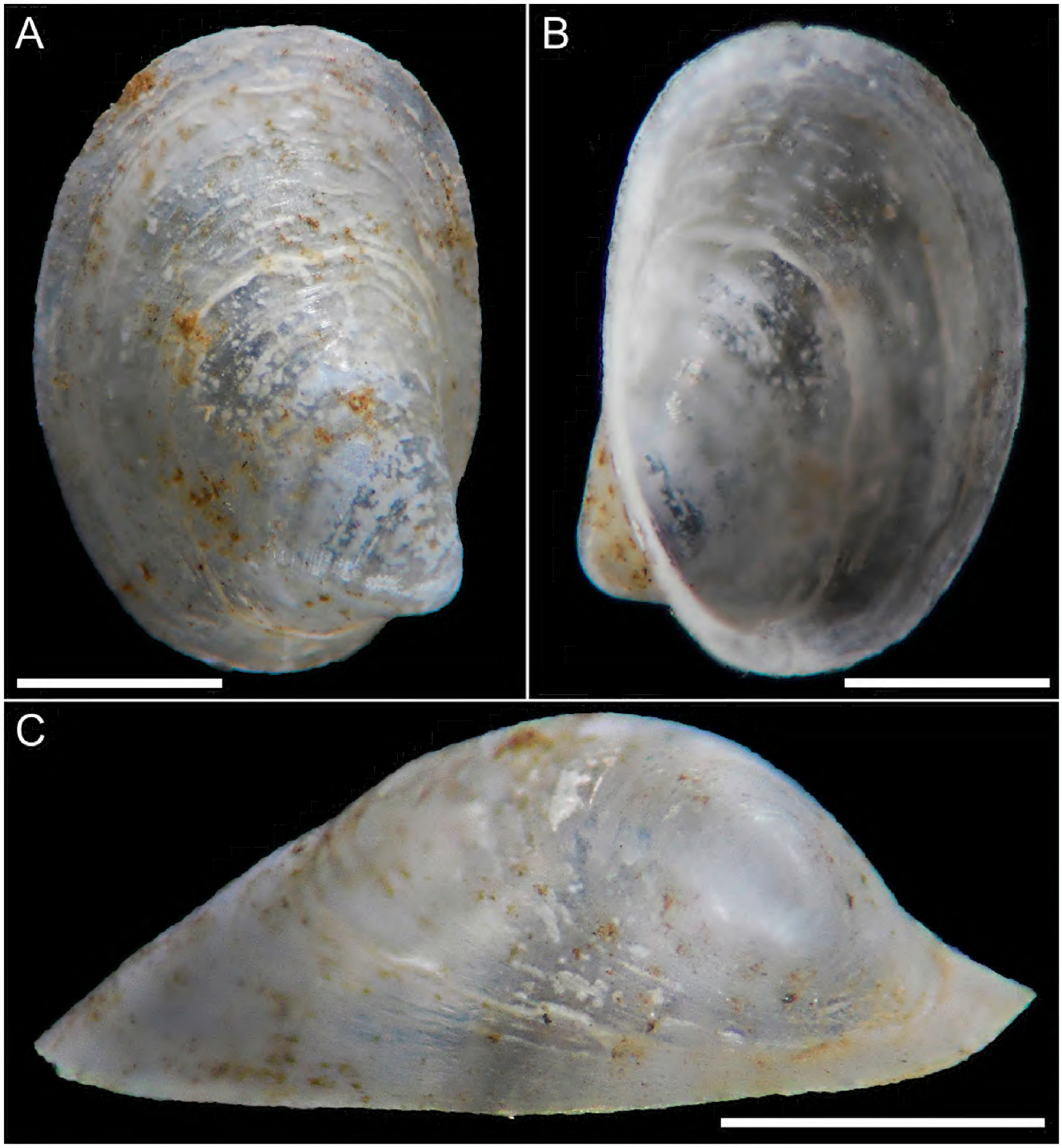

Figure 2. Shell of *Pettancylus tenuis*. **A.** Dorsal view. **B.** Ventral view. **C.** Lateral view. Scale bars = 1 mm.

Mani, Sundaram & Muthukalingan, 2015 occurs in hill streams of South India (Sankarappan et al. 2015).

Discovery of *P. tenuis* adds to the approximately 20 species (the exact number is still uncertain) known from the region (Subba Rao and Mitra 1979; Subba Rao et al. 1994; Pati and Sharma 2013). We cannot comment on any morphological variation due to very few collected specimens. Members of this genus have been reported to act as an intermediate host for the human schistosome *Schistosoma haematobium* (Sankarappan et al. 2015), though, we did not find schistosomes in our samples. This species was found along with gastropods *Filopaludina bengalensis* (Lamarck, 1822), *Indoplanorbis exustus* (Deshayes, 1833), *Melanoides tuberculata* (Müller, 1774), *Physella acuta* (Draparnaud, 1805), and a bivalve species from the genus *Corbicula* Megerle von Mühlfeld, 1811.

Detailed studies of Indian freshwater limpets are few and have mostly relied on shell characters (Sankarappan et al. 2015). Studies on North American planorbid limpets have shown shell morphology to be highly variable and unreliable for species identification (Walther et al. 2006). Therefore, the taxonomy and systematics of Indian *Pettancylus* species need revision.

The wetland where we found *P. tenuis* is within the urbanized region of Pune and is known to harbor a high diversity of birds (KA and SD pers. obs.). Areas within cities, such as this wetland, are important for supporting

biodiversity and maintaining the inherent ecological value of the landscape. Unfortunately, this wetland is facing multiple threats which include sewage discharge, debris dumping, sand mining (authors' pers obs.), and invasive species like *Physella acuta*. Thus, it is vital to document the biodiversity of such areas for their future protection and conservation.

Authors' Contributions

Conceptualization: SD, KA, SP. Formal analysis: YS. Funding acquisition: CV. Investigation: YS, SP. Methodology: YS. Visualization: SP. Writing—original draft: SP, CV. Writing—review and editing: SD, KA.

Acknowledgements

We acknowledge the Principal, Modern College, Shivajinagar, for providing the facilities. We thank Jeevitnadi – Living River Foundation members Sanjeev Naik, Shubha Kulkarni, and other volunteers working at the confluence of the Mula–Ram rivers for their support during fieldwork. We also thank Dr. Avinash Vanjare (Ahmednagar College) and Prashant Ingale (Biologia Life Science LLP), for his help during field and lab work. We acknowledge N.A. Aravind (Ashoka Trust for Research in Ecology & the Environment) for his help in confirming the identity of the species. The authors thank Carl Christensen for his useful suggestions.

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